

## HIGH TIDES.

Cape Lookout, North Carolina, 2d: very high tide, covering the whole island, and drowning a large number of sheep and cattle. High tides also occurred at this station on the 3d, 4th, 6th, 7th, 8th, 15th, 18th, 19th, 20th, 22d.

Punta Rassa, Florida, 21st.

## ICE IN RIVERS AND HARBORS.

*Lake Erie.*—Buffalo, New York: the lake at this place was clear of ice on the 5th.

*Lake Superior.*—Duluth, Minnesota, 2d: the barge "Osceola" departed on this date, being the first boat to leave this port for the lower lakes.

Marquette, Michigan, 5th: the barge "Osceola" was the first boat of the season to arrive from Duluth, Minnesota. The passenger steamers "Saint Paul" and "Winslow" arrived on the 10th, and reported having encountered considerable ice. On the 17th, the inner harbor became filled with ice. On the 18th, the captain of the steamer "Toledo" reported that the ice extended along the shore of the lake from this place to the mouth of Saint Mary's river, and in places it extended lakeward for a distance of fourteen miles.

*Devil's lake.*—Fort Totten, Dakota: the lake became clear of ice at this place on the 13th.

## TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors at the Signal-Service stations, with the average depth at which the observations were made, are given in the following table. In this table is also shown the mean temperature of the air at the various stations, and the monthly ranges of water temperature. The smallest monthly ranges are as follows: Portland, Maine, 3°.7; Eastport, Maine, 4°.6; Smithville, North Carolina, 5°; Duluth, Minnesota, 6°.5; Pensacola, Florida, 6°.5. The largest are: Buffalo, New York, 23°.5; Cedar Keys, Florida, 20°.5; Alpena, Michigan, 20°.4; New Haven, Connecticut, 17°.5; Toledo, Ohio, 17°.1.

Temperature of Water for May, 1883.

STATION.	Temperature at bottom.		Range.	Average depth, feet and inches.	Mean temperature of the air at station.
	Max.	Min.			
Atlantic City, New Jersey.....	58.6	47.0	11.0	ft. in.	56.7
Alpena, Michigan.....	58.4	38.0	20.4	11 2	44.0
Augusta, Georgia.....	79.0	62.0	17.0	8 1	70.5
Baltimore, Maryland.....	66.0	54.0	12.0	9 8	64.0
Block Island, Rhode Island.....	54.6	43.7	10.9	8 11	52.6
Boston, Massachusetts.....	59.1	45.7	13.4	21 3	55.5
Buffalo, New York.....	59.0	35.5	23.5	10 1	50.0
Cedar Keys, Florida.....	86.0	65.5	20.5	10 10	75.1
Charleston, South Carolina.....	75.1	65.0	10.1	39 11	70.8
Chicago, Illinois.....	54.7	49.2	5.5	7 4	52.1
Chincoteague, Virginia.....	71.0	55.0	16.0	5 8	60.0
Cleveland, Ohio.....	56.7	44.4	12.3	14 0	54.2
Detroit, Michigan.....	55.0	45.0	10.0	23 7	54.0
Delaware Breakwater, Delaware.....	61.4	49.5	11.9	9 3	58.1
Duluth, Minnesota.....	44.0	37.5	6.5	14 10	45.5
Eastport, Maine.....	41.7	37.1	4.6	15 7	47.4
Escanaba, Michigan.....	50.0	37.5	12.5	15 0	45.1
Galveston, Texas.....	79.0	71.0	8.0	12 8	75.6
Grand Haven, Michigan.....	63.7	50.1	13.6	19 0	56.6
Indianola, Texas.....	81.5	73.6	7.9	9 4	76.2
Jacksonville, Florida.....	81.0	72.0	9.0	18 0	73.9
Key West, Florida.....	86.4	78.2	8.2	17 1	79.5
Mackinaw City, Michigan.....	43.8	32.8	11.0	13 0	44.7
Marquette, Michigan.....	43.0	35.0	8.0	9 10	44.0
Milwaukee, Wisconsin.....	53.0	42.6	10.4	8 0	49.6
Mobile, Alabama.....	77.0	69.5	7.5	17 0	72.0
New Haven, Connecticut.....	65.7	48.2	17.5	15 1	56.5
New London, Connecticut.....	56.0	45.0	11.0	12 7	56.6
New York City.....	61.5	46.7	14.8	17 4	59.0
Norfolk, Virginia.....	72.0	58.0	14.0	16 11	66.3
Pensacola, Florida.....	78.6	73.1	5.5	17 9	72.2
Portland, Maine.....	44.7	41.0	3.7	18 11	54.9
Portland, Oregon.....	59.8	47.6	12.2	62 5	57.4
Provincetown, Massachusetts.....	59.0	44.5	14.5	14 0	53.9
Punta Rassa, Florida.....	87.5	76.1	11.4	11 1	75.3
Sandy Hook, New Jersey.....	56.0	46.2	9.8	1 5	58.6
San Francisco, California.....	61.8	52.6	9.2	29 4	56.8
Savannah, Georgia.....	76.8	66.9	9.9	12 4	72.7
Smithville, North Carolina.....	71.0	66.0	5.0	10 0	68.5
Toledo, Ohio.....	64.3	47.2	17.1	11 7	55.8
Wilmington, North Carolina.....	74.5	60.0	14.5	13 0	69.0

\* No observations from 1st to 14th inclusive.

† Observations interrupted by ice on the 1st, 2d, and 4th.

## VERIFICATIONS.

## INDICATIONS.

The detailed comparison of the tri-daily indications for May, 1883, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 89.54 per cent. The percentages for the four elements are: weather, 93.28; direction of the wind, 90.01; temperature, 89.06; barometer, 85.74 per cent. By geographical districts, they are: For New England, 85.58; middle Atlantic states, 87.50; south Atlantic states, 91.13; eastern Gulf, 93.82; western Gulf, 92.42; lower lakes, 89.53; upper lakes, 87.43; Ohio valley and Tennessee, 90.72; upper Mississippi valley, 89.50; Missouri valley, 87.87.

There were twenty-six omissions to predict out of 3,720, or 0.70 per cent. Of the 3,694 reductions that have been made, seventy-three, or 1.98 per cent., are considered to have entirely failed; seventy-three, or 1.98 per cent., were one-fourth verified; three hundred and thirty-one, or 8.96 per cent., were one-half verified; three hundred and seventy-two, or 10.07 per cent., were three-fourths verified; 2,845 or 77.01 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

## CAUTIONARY SIGNALS.

During May, 1883, one hundred and thirty-nine cautionary signals were displayed. Of these, one hundred and seventeen, or 84.17 per cent., were justified by winds of twenty five miles or more per hour, at or within one hundred miles of the station. Six cautionary off-shore signals were ordered, of which three, or 50.0 were justified both as to direction and velocity, and the remaining three were justified as to velocity, but not as to direction. Fifteen cautionary signals were changed to off-shore signals. One hundred and forty-five signals, of all kinds, were displayed, of which one hundred and twenty, or 82.76 per cent., were fully justified. These do not include signals ordered at display stations, where the velocity of the wind is only estimated. Eleven signals were ordered late. One hundred and twenty-nine winds of twenty-five miles or over per hour were reported, for which no signals were ordered; many of these were high local winds or strong sea-breezes.

## ATMOSPHERIC ELECTRICITY.

## AURORAS.

But few auroral displays were reported during the month, none of which were noted for brilliancy or extent of observation.

On the 1st a display was observed at Saint Vincent, Minnesota; Toronto, Ontario; Newport, Vermont; Charlottetown, Prince Edwards' Island; Sydney, Nova Scotia, and on the summit of Mount Washington. At the latter station it was seen from 10.15 p. m. until midnight. It extended over about 40° of the northern horizon, and to an altitude of 20°.

Auroral displays were observed on other dates as follows:

2d.—Eastport, Maine: a faint display was observed at 11.30 p. m.

3d.—Litchfield, Michigan.

4th.—Eastport, Maine: faint straw-colored auroral light observed from 11 p. m. until the morning of the 5th. This display was also reported to have been visible at Oswego, New York, at 2 a. m. of the 5th.

5th.—Lansing, Michigan; Vevay, Indiana.

6th.—Saint Vincent, Minnesota: faint auroral arch observed at 9.40 p. m., extending over about 40° of the northern horizon, and to an altitude of 40°.

8th.—Vevay, Indiana.

9th.—Fort Assiniboine, Montana.

13th.—Eastport, Maine: a faint auroral light was visible from 9 p. m. until the morning of the 14th. This display was also seen at Gardiner, Maine, and Toronto, Ontario.

16th.—Sussex, Wisconsin: An aurora was observed from 8.30 to 8.45 p. m.

19th.—Woodstock, Maryland: An aurora was observed at